

Claims

1. A radial spherical crystallization product comprising needle-shaped projections radiating from the crystal core.
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2. The radial spherical crystallization product according to claim 1 having an aerodynamic diameter of 0.1-20 µm.
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3. The radial spherical crystallization product according to claim 1 or 2 having a bulk density of 100 mg/ml or less.
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4. A radial spherical crystallization product obtained by emitting a supercritical fluid or a mixture of a supercritical fluid and a modifier and a solution comprising a sample component into a crystallization vessel through different flow channels to cause them to come in contact with each other as they are emitted into the crystallization vessel.
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5. The radial spherical crystallization product according to claim 4, wherein the supercritical fluid or the mixture of the supercritical fluid and a modifier is a poor solvent for the sample component.
6. The radial spherical crystallization product according to claim 4 or 5, wherein the sample component is a pharmaceutical drug.
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7. The radial spherical crystallization product according to claim 4 or 5, wherein the sample component is a drug carrier.

8. The radial spherical crystallization product according to claim 7, wherein the drug carrier is a sugar or sugar alcohol.

9. The radial spherical crystallization product according to any one of
5 claims 4-8, wherein the supercritical fluid is carbon dioxide.

10. The radial spherical crystallization product according to any one of claims 4-9, wherein the modifier is ethanol.

10 11. The radial spherical crystallization product according to any one of claims 1-10 used as a raw drug for a dry powder preparation.

12. The radial spherical crystallization product according to any one of claims 1-10 used as a drug carrier for a dry powder inhaler.

15 13. A method for manufacturing a radial spherical crystallization product characterized by injecting a supercritical fluid or a mixture of a supercritical fluid and a modifier and a solution comprising a sample component into a crystallization vessel through different flow channels to cause them to come in contact with each other as 20 they are emitted into the crystallization vessel.

14. The method for manufacturing a radial spherical crystallization product according to claim 13, wherein the supercritical fluid or the mixture of the supercritical fluid and a modifier is a poor solvent for the sample component.

25 15. The method for manufacturing a radial spherical crystallization product according to claim 13 or 14, wherein the sample component is a pharmaceutical drug.

16. The method for manufacturing a radial spherical crystallization product according to claim 13 or 14, wherein the sample component is a drug carrier.

17. The method for manufacturing a radial spherical crystallization product
5 according to claim 16, wherein the drug carrier is a sugar or sugar alcohol.

18. The method for manufacturing a radial spherical crystallization product according to any one of claims 13-17, wherein the supercritical fluid is carbon dioxide.

10 19. The method for manufacturing a radial spherical crystallization product according to any one of claims 13-18, wherein the modifier is ethanol.

20. A dry powder inhaler comprising the radial spherical crystallization product according to claim 6 as an active ingredient.

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21. A dry powder inhaler comprising the radial spherical crystallization product according to claim 7 or 8 as a carrier.